



THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY
OCCUPATIONAL HYGIENE / INDOOR AIR QUALITY PROGRAM
www.mass.gov/dos

Thermal Comfort Guidelines for Indoor Air Quality

In the absence of any law or regulation dealing with thermal comfort in the workplaces of the Commonwealth of Massachusetts, the Occupational Hygiene Program provides the following guidelines summarized in the table below. These guidelines are taken from the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 55-1992. The ASHRAE Standard describes the temperature and humidity ranges that are comfortable for 80% of people engaged in largely sedentary activities. It assumes normal indoor clothing. A person's age, activity level, and physiology affect the ideal thermal comfort for that individual.

Uniformity of temperatures is important to comfort. Temperatures can vary from room to room or can be stratified so that there are warm and cool zones at different levels within a room. A well-designed ventilation system and proper insulation are needed to minimize stratification of air temperatures and maximize thermal comfort. If air is not properly mixed, there may be warmer air near the ceiling and cooler air by the floor. Ventilation diffusers should be spaced to provide even heating and cooling to the work areas. Large windows and poorly insulated walls and floors can lead to drafts in the winter and heat gain in summer. Recent evidence suggests that the perceived air quality is worse when temperatures rise above 76°F regardless of the actual air quality.

Humidity is also a factor. Excessively high or low relative humidity can both produce discomfort. There is considerable debate concerning recommended levels of humidity. In general, the range of humidity levels recommended by different organizations ranges from 30-60%.

Elevated relative humidity reduces the body's ability to lose heat through perspiration and evaporation. When this happens, individuals may perceive temperatures to be higher than they actually are. High relative humidity may also promote the growth of mold and mildew. On the other end, low relative humidity can cause discomfort due to drying of the nose, throat, mucous membranes and skin. However, the addition of humidity is usually not recommended due to the risks of enhanced microbial growth associated with improperly maintained humidification systems. Decreasing the temperature to the low end of the comfort range is one way to increase the relative humidity level in winter months.

Suggested Ranges of Temperature and Relative Humidity During Summer and Winter (Assumes typical summer and winter clothing at light/sedentary activity levels)

Relative Humidity	Winter Temperature	Summer Temperature
30%	68.5°F-75.5°F	74.0°F-80.0°F
40%	68.0°F-75.0°F	73.5°F-80.0°F
50%	68.0°F-74.5°F	73.0°F-79.0°F
60%	67.5°F-74.0°F	73.0°F-78.5°F